

CLAIMS

What is claimed is:

1. An electric machine including a starter, generator, or a starter-generator for a motor vehicle, presenting a housing and comprising:

a winding with coils or coil groups, including connector heads;

power electronics units with power switch components distributed along the perimeter of the housing;

conductor rails connected with power electronics units;

coil exit rails going from a power electronics unit to an associated coil or coil group;

wherein the power electronics units are arranged on the face of the housing in a clearance created by the connector heads, which are located radially outside or inside the connector heads; and

wherein the power switch components are arranged directly – without inserted electric insulation – on one of the power loops or a coil exit rail.

2. The electric machine of claim 1, wherein the contact area of the power switch components are arranged parallel with a radial surface of the housing.

3. The electric machine of claim 1, wherein the winding is a structural part winding.

4. The electric machine of claim 1, wherein the winding coils present different structural parts comprising connector heads made of layered structural part connector lines, wherein said connector heads comprise overlapping connector lines of a plurality of coils and extend outwards in an axial direction from a housing, and are thus retained in a radial direction outside or inside the clearance, providing a storage space for the power electronics units.

5. The electric machine of claim 1, wherein the power loops are arranged in the clearance created by the connector heads, and in which also the power electronics units are located.

6. The electric machine of claim 1, wherein at least one of the conductor rails and the coil exit rails on which the power switch components are arranged directly, are thermally connected with a heat sink.

7. The electric machine of claim 6, wherein said heat sink is created by a cooling duct coupling intended to be coupled with a cooling cycle of a combustion engine of a motor vehicle.

8. The electric machine of claim 1, wherein at least one of the conductor rails is shaped as a duct designed to host a coolant flow, and the power switch

components are in thermal contact with at least one conductor rail containing a coolant.

9. The electric machine of claim 1, wherein the power electronics units present half bridge circuits, each electrically connected with one extremity of a coil or coil group, wherein the other extremities of the coils or coil groups are electrically connected, or wherein the power electronics units present full bridge circuits.

10. The electric machine of claim 1, wherein each power electronics unit also comprises at least one driving circuit triggering the power switch.

11. The electric machine of claim 10, comprising a bus triggering the driving circuit.

12. The electric machine of claim 10, wherein each power electronics unit comprises at least one indirect capacitor.

13. The electric machine of claim 1, arranged in such a way that an interior rotary field is created by means of a polyphase current and comprising a winding with a plurality of phase part-windings, wherein each phase part-winding comprises at least two coils, and wherein at least two power electronics units arranged at the perimeter of the housing are allocated to each phase part-winding, and wherein

said power electronics units are separately connected electrically with different coils of the phase part-winding or different coil groups of the phase part-winding, thus only allowing part of the current of one phase to run through one power electronics unit.

14. The electric machine of claim 1, wherein said machine is designed as a crank machine, or a machine comprising self-bearings, creating the coupling with the connecting rod of the vehicle.

15. An electric machine designed as a starter, generator, or a starter-generator for a motor vehicle, having a housing, and comprising:

a winding with coils or coil groups presenting connector heads;

power electronics units distributed along the perimeter of the housing, and including power switch components;

wherein the power electronics units are arranged on the face of the housing in a clearance of the connector heads, which are located radially outside or inside the connector heads; and

wherein the components of said power electronics units comprise a support area, and both the power electronics unit and the support area are arranged on a contact surface;

wherein said contact surface of the power switch components is arranged parallel with the radial surface of the housing.

16. The electric machine of claim 15, wherein the components creating the power switch are arranged directly – without inserted electric insulation – on one of the direct current loops or a coil exit rail.

17. The electric machine of claim 15, wherein the winding is a structural part winding.

18. The electric machine of claim 17, wherein the winding coils present different structural parts comprising connector heads made of layered structural part connector lines, wherein said connector heads comprise overlapping connector lines of a plurality of coils and extend outwards in an axial direction from a housing, and are thus retained in a radial direction outside or inside the clearance, providing a storage space for the power electronics units.

19. The electric machine of claim 15, wherein the power loops are arranged in the clearance created by the connector heads, and in which also the power electronics units are located.

20. The electric machine of claim 15, wherein at least one of the conductor rails and the coil exit rails on which the power switch components are arranged directly, are thermally connected with a heat sink.

21. The electric machine of claim 15, wherein at least one of the conductor rails is shaped as a pipe designed to host a coolant flow, and the power switch components are in thermal contact with at least one conductor rail containing a coolant.

22. An electric machine designed as a starter, generator, or a starter-generator for a motor vehicle, including a housing, and comprising:

- a winding with coils or coil groups presenting connector heads;

- power electronics units distributed along the perimeter of the housing and including power switch components;

- wherein the power electronics units are arranged on the face of the housing in a clearance of the connector heads, which are located radially outside or inside the connector heads;

- conductor rails connected with power electronics units;

- wherein at least one of the conductor rails is shaped as a pipe designed to host a coolant flow; and

- the power switch components are in thermal contact with at least one conductor rail containing a coolant.

23. The electric machine of claim 22, wherein the components creating the power switch are arranged directly – without inserted electric insulation – on one of the

direct current loops or a coil exit rail (25).

24. The electric machine of claim 22, wherein the contact area of the power switch components are arranged parallel with a radial surface of the housing.

25. The electric machine of claim 22, wherein the conductor rail containing a coolant is designed to be connected with a coolant circuit of a combustion engine of a motor vehicle.